

FIG. 1

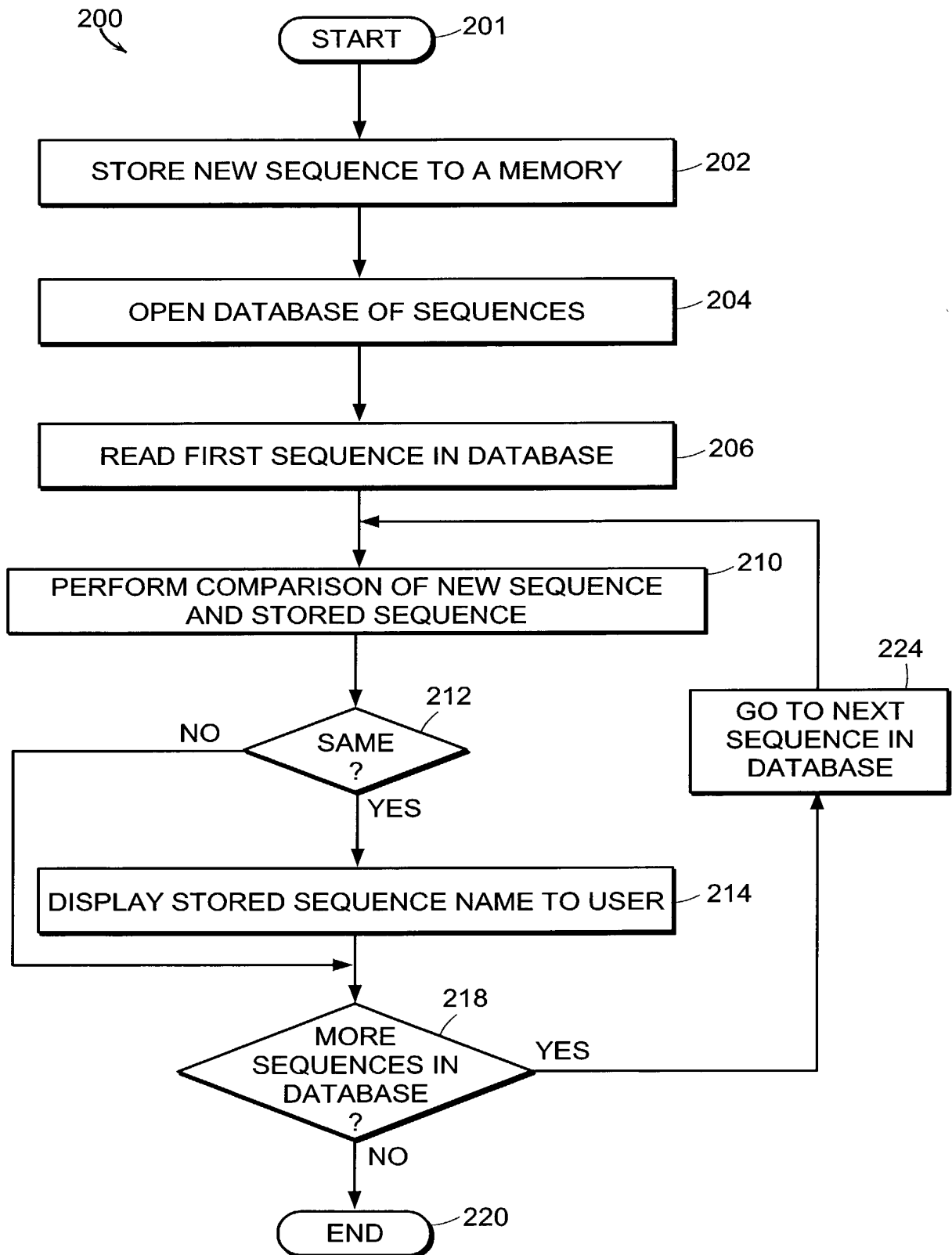


FIG. 2





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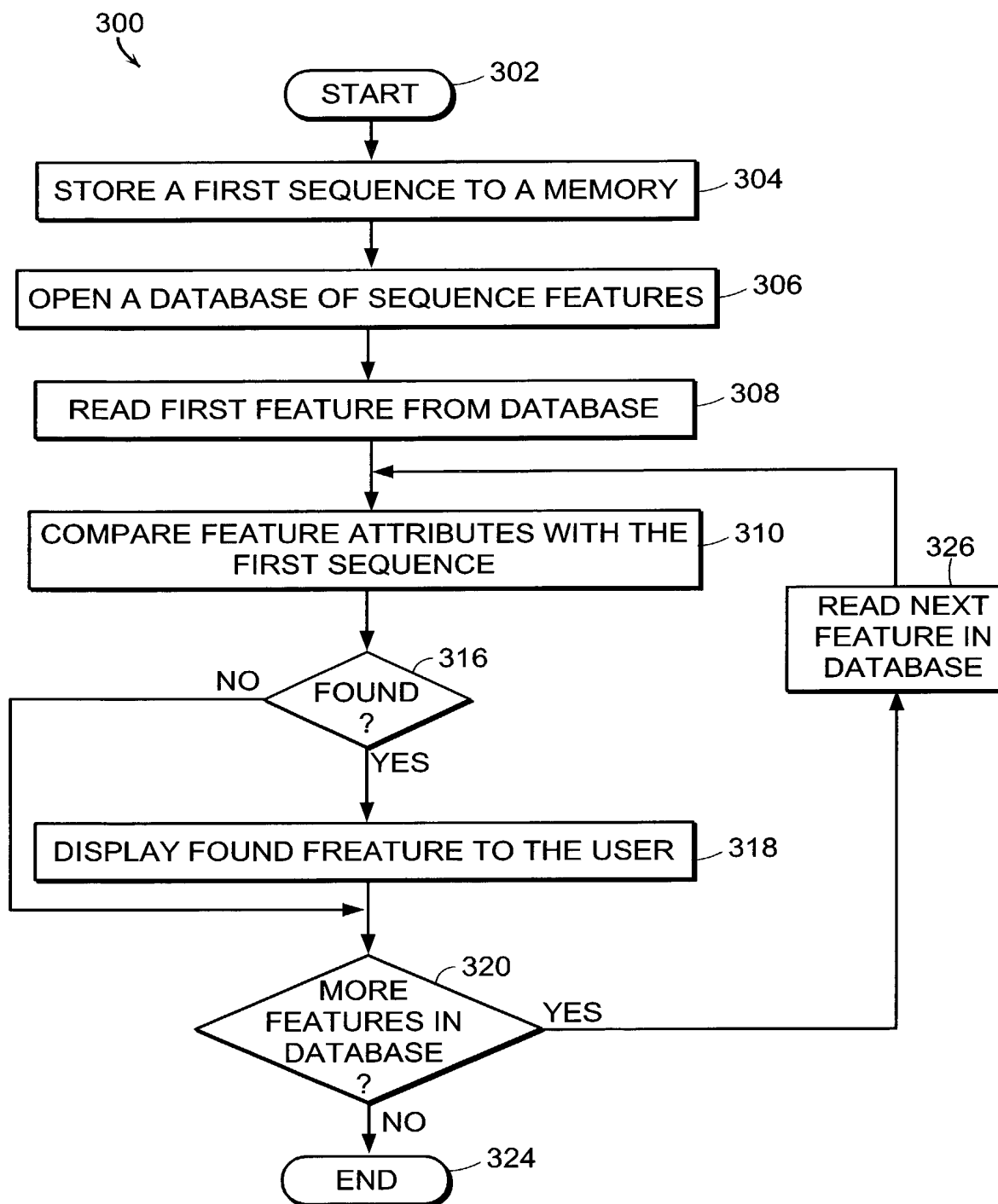


FIG. 4



FIGURE 5A NUCLEOTIDE SEQUENCE FOR Y. PESTIS BLAST PHYTASE (SEQ ID NO:1)

ATGTCAGTATTAGAAAATCGTGTACGGCTATCTGGGCTGGTATTGATGCTAAGCGGA
TTGGCTGCTATTACTGCGCCGGTAGCCGCCGAGCCATCGGGCTATACTTTAGAACGT
GTGGTTATTTTGAAGTCGCCATGGTGTTCGCTCGCCGACCAAACAAACGCAGCTTATG
AATGATGTTACGCCAGATAAGTGGCCACAATGGCCGGTAAAAGCGGGGTATTTAAC
GCCACGTGGTGCAGGAGTTGGTCACATTGATGGGGGGGGTATTTATGGTGATTACTTTCG
CAGCCTTGGTTTGTAGCGGCGGGATGTCCGGCAGAGGGGGGGGTATATGCACAGG
CAGATATCGATCAACGTACCCGCTTAACCGGACAGGCATTTCTTGATGGTGTGGCTC
CGGGGTGTGGTTTGACCGTGCATAATCAGGCCGATTTGAAAAAGACCGATCCCCTGT
TCCATCCGGTAGAGGNTGGCGTGTGTAAGTTANACGNNGCACAAACAGATAAAGCG
ATTGAAGAACANTTGGGCGGGCCGTTAGATACGGTGAGCCAGCGCTACGCTAAACC
TTTTGCCCAGATGGGGGACGTGCTGAATTTTGGCGCTTCTCCTTATTGCAAATCTTTG
CAACAGCAAGGAAAAACGTGTGATTTTGCCCACTTTGCGGCCAATGAAGTTAACGTT
AATAAAGAAGGGACAAAAGTGACCCTCAGTGGGCCACTGGCGTTATCATCGACATT
GGGTGAAATCTTCTTATTACAAAACGCACAAGCCATGCCAGAGGTTGCCTGGCAAC
GGCTAAAAGGGGCGGAGAATTGGGTATCCTTATTGTCATTACATAACGCGCAATTTA
ATTTAATGGCAAAAACACCGTATATCGCCCGTCATAAAGGGACGCCATTATTACAGC
AGATAGATACGGCTTTAACCCTTCAACTGGATGCTCAGGGGCAAAAGCTACCCATTT
CAGCCCAAAACCGGGTCTTGTTCCTCGGTGGGCATGATACCAATATTGCCAATATTG
CGGGTATGCTGGGAGCCGACTGGCAGCTACCCGAGCAACCTGATAATACTCCACCA
GGTGGGGGATTGGTTTTTGAACATATGGCAAAATCCGGATAACCACCAGCGCTACGTT
GCGGTGAAGATGTTCTACCAAACGATGGATCAGTTGCGTAATGCCGAAAAATTGGA
TCTGAAAAATAACCCAGCGGGTATTATTTCCGTTGCAGTTGCTGGTTGTGAAAAATAA
CGGTGACGATAAGCTTTGCGAGCTTGATACATTCCAAAAGAAAGTGGCTAAGGTAA
TTGAACCTGCCTGCCACATCTAA

FIGURE 5B NUCLEOTIDE SEQUENCE FOR CORRECTED Y. PESTIS BLAST PHYTASE (SEQ ID NO:2)

MSVLENRVRLSGLVLMLSLGLAAITAPVAAEPSGYTLERVVILSRHGVRSPTKQTQLMND
VTPDKWPQWPVKAGYLTPRGAELVTLMGGFYGDYFRSLGLLAAGCPAEGGVYAQADI
DQRLTLTGQAFLDGVAPGCGLTVHNQADLKKTDPLFHPVEXGVCKLXXAQTDKAIEEX
LGGPLDVTVSQRYAKPFAQMGDVLNFAASPYCKSLQQQGKTCDFAHFAANEVNVNKEG
TKVTLGSLALSSTLGEIFLLQNAQAMPEVAWQRLKGAENWVSLLSLHNAQFNLMAKT
PYIARHKGTPLLQQIDTALTLQLDAQGQKLPISAQNRVFLGGHDTNIANIAGMLGADW
QLPEQPDNTPPGGGLVFELWQNPNDNHQRYVAVKMFYQTMQDLRNAEKLDLKNNPAGII
SVAVAGCENNGDDKLCELDTFQKKVAKVIEPACHI



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**FIGURE 5C NUCLEOTIDE SEQUENCE FOR CORRECTED Y. PESTIS PHYTASE
(SEQ ID NO:3)**

ATGTCAGTATTAGAAAATCGTGTACGGCTATCTGGGCTGGTATTGATGCTAAGCGGA
TTGGCTGCTATTACTGCGCCGGTAGCCGCCGAGCCATCGGGCTATACTTTAGAACGT
GTGGTTATTTTGAGTCGCCATGGTGTTCGCTCGCCGACCAAACAAACGCAGCTTATG
AATGATGTTACGCCAGATAAGTGGCCACAATGGCCGGTAAAAGCGGGGGTATTTAAC
GCCACGTGGTGCGGAGTTGGTTCACATTGATGGGGGGGGTTTATGGTGATTACTTTTCG
CAGCCTTGGTTTTGTTAGCGGCGGGATGTCCGGCAGAGGGGGGGGGTATATGCACAGG
CAGATATCGATCAACGTACCCGCTTAACCGGACAGGCATTTCTTGATGGTGTGGCTC
CGGGGTGTGGTTTTGACCGTGCATAATCAGGCCGATTTGAAAAAGACCGATCCCCTGT
TCCATCCGGTAGAGACTGGCGTGTGTAAGTTAGACAACGCACAAACAGATAAAGCG
ATTGAAGAACGATTGGGCGGGCCGTTAGATACGGTGAGCCAGCGCTACGCTAAACC
TTTTGCCCAGATGGGGGACGTGCTGAATTTTGCGGCTTCTCCTTATTGCAAATCTTTG
CAACAGCAAGGAAAAACGTGTGATTTTGCCCACTTTGCGGCCAATGAAGTTAACGTT
AATAAAGAAGGGACAAAAGTGACCCTCAGTGGGCCACTGGCGTTATCATCGACATT
GGGTGAAATCTTCTTATTACAAAACGCACAAGCCATGCCAGAGGTTGCCTGGCAAC
GGCTAAAAGGGGCGGAGAATTGGGTATCCTTATTGTCATTACATAACGCGCAATTTA
ATTTAATGGCAAAAACACCGTATATCGCCCGTCATAAAGGGACGCCATTATTACAGC
AGATAGATACGGCTTTAACCCTTCAACTGGATGCTCAGGGGGCAAAAGCTACCCATT
CAGCCCAAAACCGGGTCTTGTTCTCCTCGGTGGGCATGATACCAATATTGCCAATATTG
CGGGTATGCTGGGAGCCGACTGGCAGCTACCCGAGCAACCTGATAATACTCCACCA
GGTGGGGGATTGGTTTTTTGAACTATGGCAAAATCCGGATAACCACCAGCGCTACGTT
GCGGTGAAGATGTTCTACCAAACGATGGATCAGTTGCGTAATGCCGAAAAAATTGGA
TCTGAAAAATAACCCAGCGGGTATTATTTCCGTTGCAGTTGCTGGTTGTGAAAATAA
CGGTGACGATAAGCTTTGCGAGCTTGATACATTCCAAAAGAAAGTGGCTAAGGTAA
TTGAACCTGCCTGCCACATCTAA



18 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

**FIGURE 5D: AMINO ACID SEQUENCE FOR CORRECTED Y. PESTIS PHYTASE
(SEQ ID NO:4)**

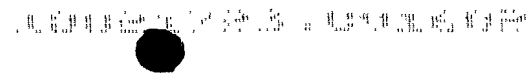
Met Ser Val Leu Glu Asn Arg Val Arg Leu Ser Gly Leu Val Leu Met Leu Ser Gly Leu Ala Ala
Ile Thr Ala Pro Val Ala Ala Glu Pro Ser Gly Tyr Thr Leu Glu Arg Val Val Ile Leu Ser Arg His
Gly Val Arg Ser Pro Thr Lys Gln Thr Gln Leu Met Asn Asp Val Thr Pro Asp Lys Trp Pro Gln
Trp Pro Val Lys Ala Gly Tyr Leu Thr Pro Arg Gly Ala Glu Leu Val Thr Leu Met Gly Gly Phe
Tyr Gly Asp Tyr Phe Arg Ser Leu Gly Leu Leu Ala Ala Gly Cys Pro Ala Glu Gly Gly Val Tyr
Ala Gln Ala Asp Ile Asp Gln Arg Thr Arg Leu Thr Gly Gln Ala Phe Leu Asp Gly Val Ala Pro
Gly Cys Gly Leu Thr Val His Asn Gln Ala Asp Leu Lys Lys Thr Asp Pro Leu Phe His Pro Val
Glu Thr Gly Val Cys Lys Leu Asp Asn Ala Gln Thr Asp Lys Ala Ile Glu Glu Arg Leu Gly Gly
Pro Leu Asp Thr Val Ser Gln Arg Tyr Ala Lys Pro Phe Ala Gln Met Gly Asp Val Leu Asn Phe
Ala Ala Ser Pro Tyr Cys Lys Ser Leu Gln Gln Gln Gly Lys Thr Cys Asp Phe Ala His Phe Ala
Ala Asn Glu Val Asn Val Asn Lys Glu Gly Thr Lys Val Thr Leu Ser Gly Pro Leu Ala Leu Ser
Ser Thr Leu Gly Glu Ile Phe Leu Leu Gln Asn Ala Gln Ala Met Pro Glu Val Ala Trp Gln Arg
Leu Lys Gly Ala Glu Asn Trp Val Ser Leu Leu Ser Leu His Asn Ala Gln Phe Asn Leu Met Ala
Lys Thr Pro Tyr Ile Ala Arg His Lys Gly Thr Pro Leu Leu Gln Gln Ile Asp Thr Ala Leu Thr Leu
Gln Leu Asp Ala Gln Gly Gln Lys Leu Pro Ile Ser Ala Gln Asn Arg Val Leu Phe Leu Gly Gly
His Asp Thr Asn Ile Ala Asn Ile Ala Gly Met Leu Gly Ala Asp Trp Gln Leu Pro Glu Gln Pro
Asp Asn Thr Pro Pro Gly Gly Gly Leu Val Phe Glu Leu Trp Gln Asn Pro Asp Asn His Gln Arg
Tyr Val Ala Val Lys Met Phe Tyr Gln Thr Met Asp Gln Leu Arg Asn Ala Glu Lys Leu Asp Leu
Lys Asn Asn Pro Ala Gly Ile Ile Ser Val Ala Val Ala Gly Cys Glu Asn Asn Gly Asp Asp Lys



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FIGURE 5E: NUCLEOTIDE SEQUENCE FOR 953-6 (SEQ ID NO: 5)

ATGATCGATAAATTTATTCCACAAGGGAGAGAGTCCGTGAAGCATAGCCTGCTTTTG
TCCGCCGCGCTGCTGGCGGGATGCGCCGCGTCCGCGCCCGGCGCCGACGCATCGCCT
GCCGCGCCGGGGTCGCTAAAGCTCGAAAAGGTCGTGATGCTGATGCGCCACGGCGT
TCGCCCCGCAACCAAGGCGGCGGTGGTGCCGCCCGGTTATTCGGCCGAAACATGGC
CCGACTGGCCGGTCGATTTTCGGCCTGCTGACGCCGCACGGCGCGGGCGGGGGTCAAG
CTGCTCGGCGAAAGCGACCGCCTCACTTTTCGGCGGTTCGCGGCCTATTCGCCGACGGT
TGTCGCCGCCGCGGGCACGATCGTCCTCAAGGCAAGCTACAAGGAGCGCACGATCGC
GACCGCGCAGAACTGGGCGCGGGGTTTCATGCCCGGCTGCACGGCGGATGTCGCGC
ATCCCGCCCGGTCCGGACGATGACGCGATCTTTCATGGGCTCGACGGCGGCCCCGCCT
CGTTCGACGGCAAGCGGGCATTTCGATGCCGCGCTCGCCAGGCGCCCGAGGGCGGG
CTGACCGCCGAAACCGCACGCCATCGCGGCGAACTGACCTTGCTCGCGAAAGTGCT
GAATTGTGCGCTGCCCCGCTGCCCCGCTGATCGCCGAGCCGAGCCGACTGGTCGCGCA
GCCGCACGATCGCCCCGATCTCGAAGGCCCGCTCGACGTCGGATCGACCGCGAGCC
AGACGCTGGTGCTGGAATATCTGGAAGGCAAGCCGATGGCCGAGGTTCGGCTGGGGC
CGCGTAAGCCGCGCCGAGATCGAGCAGTTGCTGCGCTTTCATCCGCTCAAATTCCGC
TATTCGAATCGCCCCGGCTATATCGCCGCCGCCGCCGCGGGCGCCGATCGTGCGCGAA
ATCGTTGCGGCGCTCGACAGCAACAGCCCGGCGCGGCTGACCTTGCTCGCCGGGCA
CGACACGAACGTCGCCGACCTCGGCGGCTTCTTCGACCTGCACTGGCAGGTGCCGA
GCTATCCCGCCGACGAGGTTCCGCCCGGCGAGCGCGTTGGGGTTCGAGCTGGTCAGC
AACGCGAAGGGCGACCGCTATGTCCGCGCCTTCTATCGCGCGCAGACGATGGACCA
GCTCCGCAACCTCGAACCGCTGGGGTCGGGTGACGCGCTGTACCGCCGCTATCTTCC
CATTCCGGGGTGCGGCCATTTCGGTCGAGGCAACCGCGTGCAGCTGGAGTGATTTCGC
CCGGCTCGCCGCGCCGCGCGGGTAA



Met Ile Asp Lys Phe Ile Pro Gln Gly Arg Glu Ser Val Lys His Ser Leu Leu Leu Ser Ala Ala Leu Leu Ala Gly Cys Ala Ala Ser Ala Pro Gly Ala Asp Ala Ser Pro Ala Ala Pro Gly Ser Leu Lys Leu Glu Lys Val Val Met Leu Met Arg His Gly Val Arg Pro Pro Thr Lys Ala Ala Val Val Pro Pro Gly Tyr Ser Ala Glu Thr Trp Pro Asp Trp Pro Val Asp Phe Gly Leu Leu Thr Pro His Gly Ala Ala Gly Val Lys Leu Leu Gly Glu Ser Asp Arg Leu Thr Phe Gly Gly Arg Gly Leu Phe Pro Asp Gly Cys Pro Ala Ala Gly Thr Ile Val Leu Lys Ala Ser Tyr Lys Glu Arg Thr Ile Ala Thr Ala Gln Asn Trp Ala Ala Gly Phe Met Pro Gly Cys Thr Ala Asp Val Ala His Pro Ala Gly Pro Asp Asp Asp Ala Ile Phe His Gly Leu Asp Gly Gly Pro Ala Ser Phe Asp Gly Lys Arg Ala Phe Asp Ala Ala Leu Ala Gln Ala Pro Glu Gly Gly Leu Thr Ala Glu Thr Ala Arg His Arg Gly Glu Leu Thr Leu Leu Ala Lys Val Leu Asn Cys Ala Leu Pro Ala Cys Pro Leu Ile Ala Glu Pro Ser Arg Leu Val Ala Gln Pro His Asp Arg Pro Asp Leu Glu Gly Pro Leu Asp Val Gly Ser Thr Ala Ser Gln Thr Leu Val Leu Glu Tyr Leu Glu Gly Lys Pro Met Ala Glu Val Gly Trp Gly Arg Val Ser Arg Ala Glu Ile Glu Gln Leu Leu Arg Phe His Pro Leu Lys Phe Arg Tyr Ser Asn Arg Pro Gly Tyr Ile Ala Ala Ala Ala Ala Pro Ile Val Arg Glu Ile Val Ala Ala Leu Asp Ser Asn Ser Pro Ala Arg Leu Thr Leu Leu Ala Gly His Asp Thr Asn Val Ala Asp Leu Gly Gly Phe Phe Asp Leu His Trp Gln Val Pro Ser Tyr Pro Ala Asp Glu Val Pro Pro Gly Ser Ala Leu Gly Phe Glu Leu Val Ser Asn Ala Lys Gly Asp Arg Tyr Val Arg Ala Phe Tyr Arg Ala Gln Thr Met Asp Gln Leu Arg Asn Leu Glu Pro Leu Gly Ser Gly Asp Ala Leu Tyr Arg Arg Tyr Leu Pro Ile Pro Gly Cys Gly His Ser Val Glu Ala Thr Ala Cys Ser Trp Ser Asp Phe Ala Arg Leu Ala Ala Pro Arg Gly;



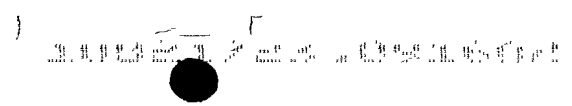
FIGURE 5G: NUCLEOTIDE SEQUENCE FOR RHIZOBIUM (SEQ ID NO: 7)

GTGAAGCATAGCCTGCTTTTGCCTGCCGCGCTGCTGGCGGGATGCGCCGCGTCCGCG
 CCCGGAGCCGACGCATCGCCTGCCGCGCCGGGGTCGCTAAAGCTCGAAAAGGTCGT
 AATGCTGATGCGCCACGGCGTTCGCCCCGCAACCAAGGCGGCGGTGGTGCCGCCCG
 GTTATTCGGCCGAAACATGGCCCCGACTGGCCGGTCGATTTCGGCCTGCTGACGCCCG
 ACGGCGCGGCGGGGGTCAAGCTTCTCGGCGAAAGCGACCGCCTCTATTTCCGGCGGT
 CGCGGCCTGTTTCCCGAGGGATGCCCGGCGGCGGGCACGATCGTCCTCAAGGCGAG
 CTACAAGGAGCGCACGATCGCCACCGCGCAGAGCTGGGCGCGGGGTTTCATGCCCG
 GCTGCGCGACGGATGTGCGGCATCCCGCCGGTCCGGACGATGACGCGATCTTTCATG
 GGCTCGACGGCGGCCCCGCTCGTTCGACGGCAAGCGGGCGTTTCGATGCCGCGCTC
 GCCCAGGCGCCCGAGGGCGGGCTGACCGCCGAAACCGCACGTCATCGCGGCGAACT
 GACCTTGCTCGCGAAAGTGCTGAATTGCGCGCTGCCCGCCTGCCCGCTGATCGCCGA
 GCCGAGCCGGCTGGTCGCGCAGCCGCACGATCGCCCCGAGATCGAAGGCCCGCTCG
 ACGTCGGATCGACCGCCAGCCAGACGCTGGTGCTGGAATATCTGGAAGGCAAGCCG
 ATGGCCGAGGTCGGCTGGGGCCGCGTGAGCCGCGCCGAGATCGAGCAGTTGCTGCG
 CTTTCATCCGCTCAAATTCCGCTATTCGAATCGCCCCGGCTATATCGCCGCCACCGCC
 GCGGCGCCGATCGTGCGCGAAATCGTCACGGCGCTCGGCGACCGAAGCCCGGCGCG
 GCTGACCTTGCTCGCCGGGCACGACACGAACGTCGCCGACCTCGGCGGCTTCTTCGA
 CCTGCACTGGCAGGTGCCGAGTTATCCCGCCGACGAGGTTCCGCCCCGGCAGCGCACT
 GGGGTTTGAAGTGGTCAGCAATGCGAAGGGCGACCGCTATGTCCGCGCCTTCTATCG
 CGGGCAGACGATGGACCAGCTCCGCAACCTCGAACCGCTGAGGTCGGACGATACGC
 TGTTCCGCCGCTATCTTCCCATTCGGGGGTGCGGCAATTCGGTCGAGGCGACCGCCT
 GCGCCTGGAGTGATTTCCGCCGGCTCGCCGCGCCGCGCGGGTAA



FIGURE 5H: AMINO ACID SEQUENCE FOR RHIZOBIUM (SEQ ID NO:8)

Val Lys His Ser Leu Leu Leu Pro Ala Ala Leu Leu Ala Gly Cys Ala Ala Ser Ala Pro Gly Ala
Asp Ala Ser Pro Ala Ala Pro Gly Ser Leu Lys Leu Glu Lys Val Val Met Leu Met Arg His Gly
Val Arg Pro Pro Thr Lys Ala Ala Val Val Pro Pro Gly Tyr Ser Ala Glu Thr Trp Pro Asp Trp Pro
Val Asp Phe Gly Leu Leu Thr Pro His Gly Ala Ala Gly Val Lys Leu Leu Gly Glu Ser Asp Arg
Leu Tyr Phe Gly Gly Arg Gly Leu Phe Pro Glu Gly Cys Pro Ala Ala Gly Thr Ile Val Leu Lys
Ala Ser Tyr Lys Glu Arg Thr Ile Ala Thr Ala Gln Ser Trp Ala Ala Gly Phe Met Pro Gly Cys Ala
Thr Asp Val Ala His Pro Ala Gly Pro Asp Asp Asp Ala Ile Phe His Gly Leu Asp Gly Gly Pro
Ala Ser Phe Asp Gly Lys Arg Ala Phe Asp Ala Ala Leu Ala Gln Ala Pro Glu Gly Gly Leu Thr
Ala Glu Thr Ala Arg His Arg Gly Glu Leu Thr Leu Leu Ala Lys Val Leu Asn Cys Ala Leu Pro
Ala Cys Pro Leu Ile Ala Glu Pro Ser Arg Leu Val Ala Gln Pro His Asp Arg Pro Glu Ile Glu Gly
Pro Leu Asp Val Gly Ser Thr Ala Ser Gln Thr Leu Val Leu Glu Tyr Leu Glu Gly Lys Pro Met
Ala Glu Val Gly Trp Gly Arg Val Ser Arg Ala Glu Ile Glu Gln Leu Leu Arg Phe His Pro Leu
Lys Phe Arg Tyr Ser Asn Arg Pro Gly Tyr Ile Ala Ala Thr Ala Ala Ala Pro Ile Val Arg Glu Ile
Val Thr Ala Leu Gly Asp Arg Ser Pro Ala Arg Leu Thr Leu Leu Ala Gly His Asp Thr Asn Val
Ala Asp Leu Gly Gly Phe Phe Asp Leu His Trp Gln Val Pro Ser Tyr Pro Ala Asp Glu Val Pro
Pro Gly Ser Ala Leu Gly Phe Glu Leu Val Ser Asn Ala Lys Gly Asp Arg Tyr Val Arg Ala Phe
Tyr Arg Gly Gln Thr Met Asp Gln Leu Arg Asn Leu Glu Pro Leu Arg Ser Asp Asp Thr Leu Phe
Arg Arg Tyr Leu Pro Ile Pro Gly Cys Gly Asn Ser Val Glu Ala Thr Ala Cys Ala Trp Ser Asp
Phe Ala Arg Leu Ala Ala Pro Arg Gly;



ATGAAGAAGACAGCATATGGAGGAGAGGTTGGACAGCGATGGCGAAGGGGTGCGTGTG
CCGCAACGGTATTGCTTTCGGCATGCTCAACGCAACTGCCGGGCGTGCCTGCAACGC
TGTCGGCCGCGGGTAGCGAGCCGCCCGGAAGGCCGCGGCAACAGATGGCATGCCG
CAAGACTGGTCGCTCGACGCGTTGGTCATCGTCAGCCGGCACGGCGTGCGGTCTCCG
ACGCGTCCGGAGCCGCCGCTGGAGAGCCTCAGCCCCGATCCGTGGCCCCAGTGGCC
CGTGCCGACTGCCACCTGACCGATCGTGGCGCGGGCGCTCGTCTCGCAGATGGGGC
GGTACTACGGTGATTGGCTTCGTGCCCGGGGTGTGCTGCCGGCCAGCGGGTGCCCTG
CGACCGGAACGCTTTACGGATGGGCAGACGTTGACCAGCGGACCCGTCTGACGGGC
GACGCCCTGCTCCTCGGCATGGCGCCAGGCTGCGGTATCCACAGCGATCATCGCGCG
GCGCTCGACGAGAAGGATCCGATCTTCCACGCGATGGAATCGGGTGCATGCCCAGT
CGACCCCGTACAGGCGAAGCGCGACATCGAAGCGCATGCCGGCGAGGGCGGGCGTG
GCGACACTGGGAAGGCGCTACGCAGCAAGCCTGACCAGAATGAGCGAGGTGCTCGA
CTACGCCCATAGCGCCGATTGCGCGAGGCATGGCGGCCAATGCGACTATGCGCGCC
AACCCAATCGTGTCGAGATCAGACCAGATGGCCTTCATGCCGCGTTGAAGGGCCCC
ATGGGCAGTGCTTCGACCGTCTCCGAGGTCTTCCTGCTCGAACATGGGCAGGGCCTG
CCACAGGAGCAGGTTGCATGGGGCCGTATCCACGATGCGCAGGACTGGACGCTGCT
GATGCAGGCGCATAACGCGCAGTTCGATCTGATGGCGAAGACGCCTTACATGGCTA
CTCGAAGGGGACGCCGATGCTCGCTTCGGTGCTCGATGCGCTTGAGCGGCGCGCTG
GCGCCCCAGCTCCGGAGCTTGCCGTCAAAGGCCCGAAGCTGCCCCAAGGCAACCGT
GTCTATGTGCTGACCGCGCATGACACGAATCTTGACACTTGGCCGGCTTGCTGCAC
TTGGACTGGACCCTGCCCGAGCAACCGGACGACACGCCGCCGGGCGGTGCAATGGT
GTTCTCCTTGTGGCGGGAGCCTGGCACGCGAGGCACGTTTCGTTTCGCGTGGAGATGGT
CTATCAGTCGATGGATCAGCTTCGGCAGCTCACGCCGCTCTCCCTGGCGCAGCCGCC
CCATCGCCTGATCTTGCCGTTGCCCGGCTGTGCCGACGCGGCGCACGGACATGCATG
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GGCTGTGACCGCGGCGCACTAG

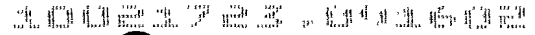


FIG. 6A

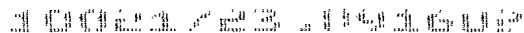


FIG. 6B



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953-6	(354)	401	450
RHIZOBIIUM		ELVSNKAG-DRYVRAFYRAQTMDQILINLEHIGSG-DALYRRYLHHPGCGH	
954-2	(342)	ELVSNKAG-DRYVRAFYRCQTMDQILINLEHIRSG-DTLFRRYLHHPGCCN	
APPA	(396)	SLWREPGTQARFVRVEMVYQSMDOILRQLTFLSLA-QPPHRLHLELPGCAD	
YERSINIA2FREY	(358)	ERWRPLSDNSQWTOVSIMFQILCOMRKTHSLN-TTPGEMKLTLAGCHE	
CONSENSUS	(366)	ELWQNPDNHORYVAVKMFYQTMDOILRNAEKLDLKNNPAGITISVAVAGCHN	
	(401)	ELW N RYVAV M YQTMDOILRNLEPL L P RI LPIPGCG	
953-6	(402)	451	482
RHIZOBIIUM		SVFATACSWSDFARLAAAPRG-----	
954-2	(390)	SVFATACAWSDFARLAAAPRG-----	
APPA	(445)	AAHGHACSLFLFSRRVRAALSPSCLEAVTAAH	
YERSINIA2FREY	(407)	RNAQGMCSLAGFTCTVNEARIPACSL-----	
CONSENSUS	(416)	NGDDKLCFLDTHOKKVKVAKVIEPACHI-----	
	(451)	S EA ACSLSDFARLVA PAC	

FIG. 6C



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FIG. 7A

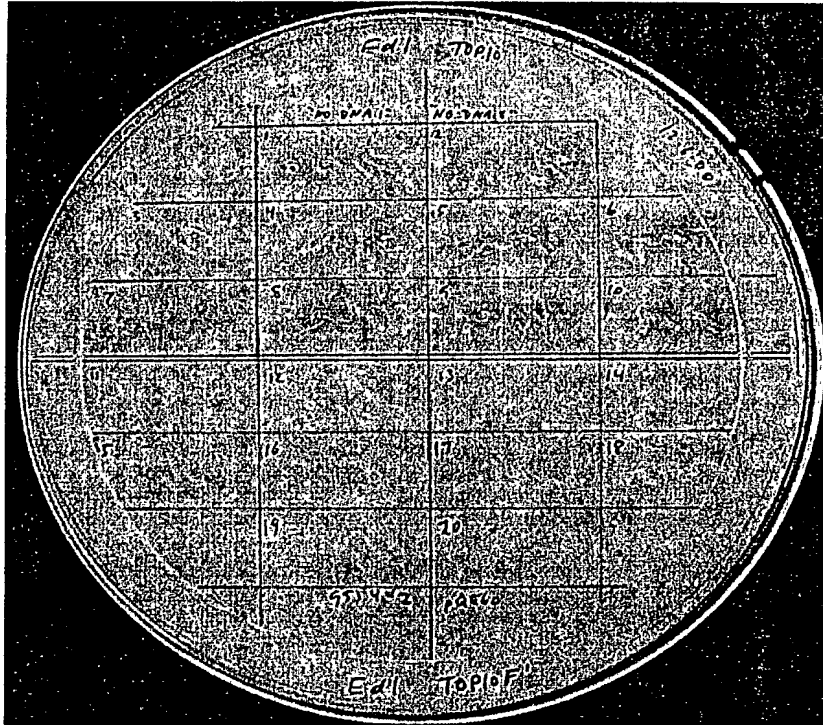


FIG. 7B

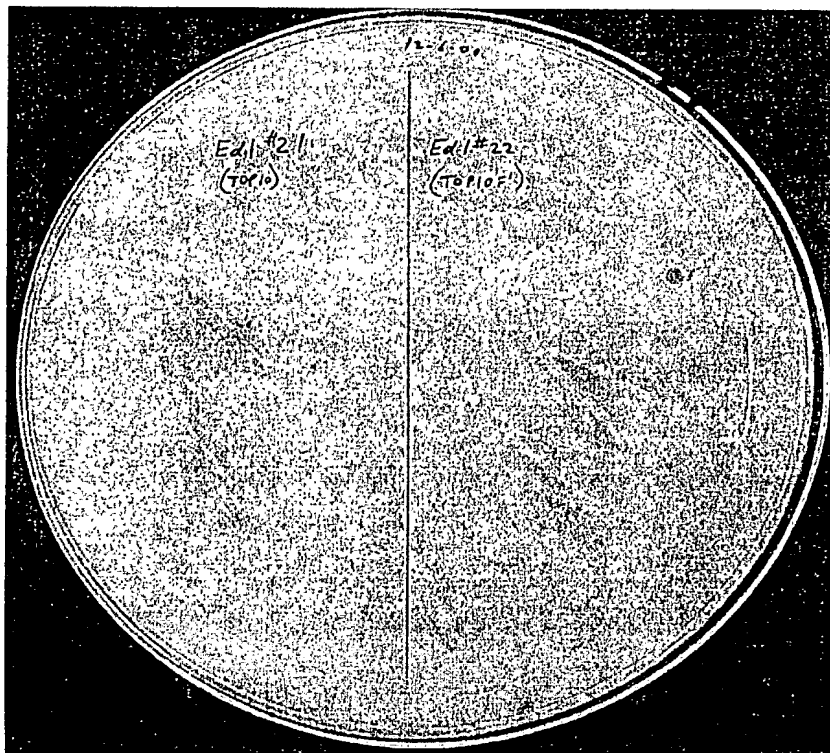




Fig. 8

$T_{1/2}$ of Phytase in Pepsin Digestion

Host	T _{1/2} (min)
E. Coli	~8
Pichia	~10
S. Cerevisiae	~25

FIG. 9

QSEPELKLES VVIVSRHGVR APTKATQLMQ DVTPDAMP**TW** PVKLGELTPR GGELIAYLGH
YWRQRLVADG LJPKCGCPQS GQVAIIADVD ERTRKTGEAF AAGLAPDCAI TVH**TQADTS**
PDPLENPLKT GVCQLDN**AV** TDAILERAGG SIADFTGHYQ TAFRELERVL NFPQSNLCLK
REKQDESCSL TQALPSELKV SADCVSLTGA VSLASMLTEI FLLQQAQGMPEPGWGRITDS
HQWNTLLSLH NAQFDLLQRT PEVARSRATP LLDLIK**TALT** PHPPQQAQGVTLPTSVLFI
AGHDTNLNL GGALEL**NWTL** PGQPDNTPPG GELVFERWRR LSDNSQWIOVSLVFQTLQOM
RDKTPLSLNT PPGEVKLTLA GCEERNAQGM CSLAGFTQIV NEARIPACSL

FIG. 10

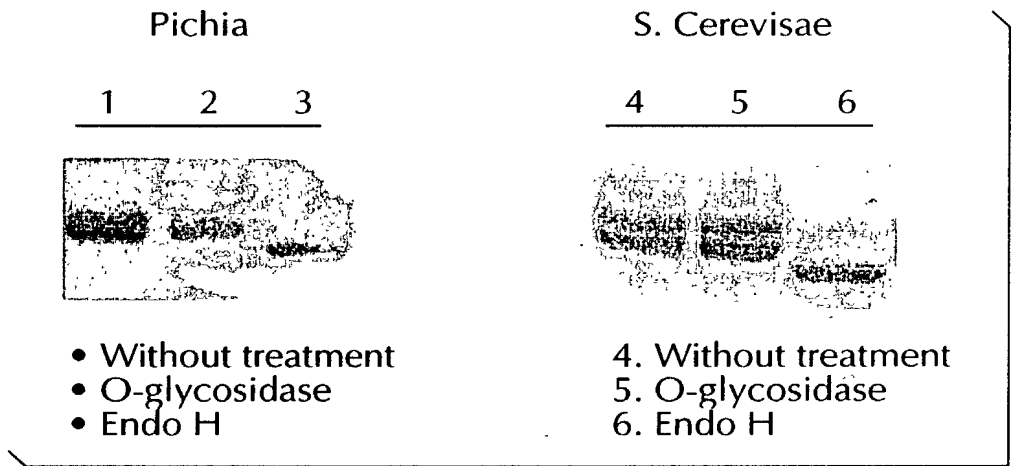
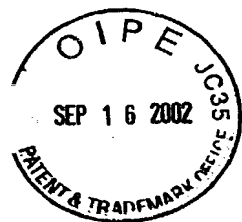


FIG. 11

	Pichia	S. Cerevisiae
O-glycosilation	no	no
N-glycosilation	yes	yes
N-glycosilated form	1 dominates	2



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FIG. 12A

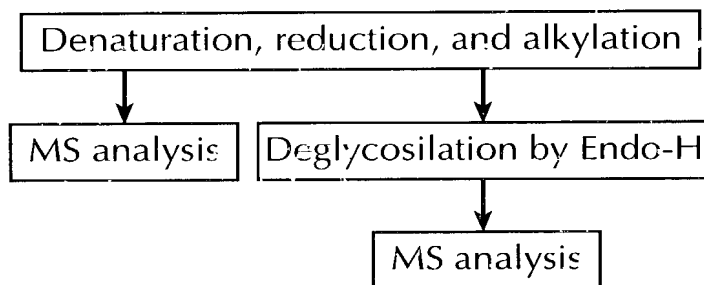


FIG. 12B

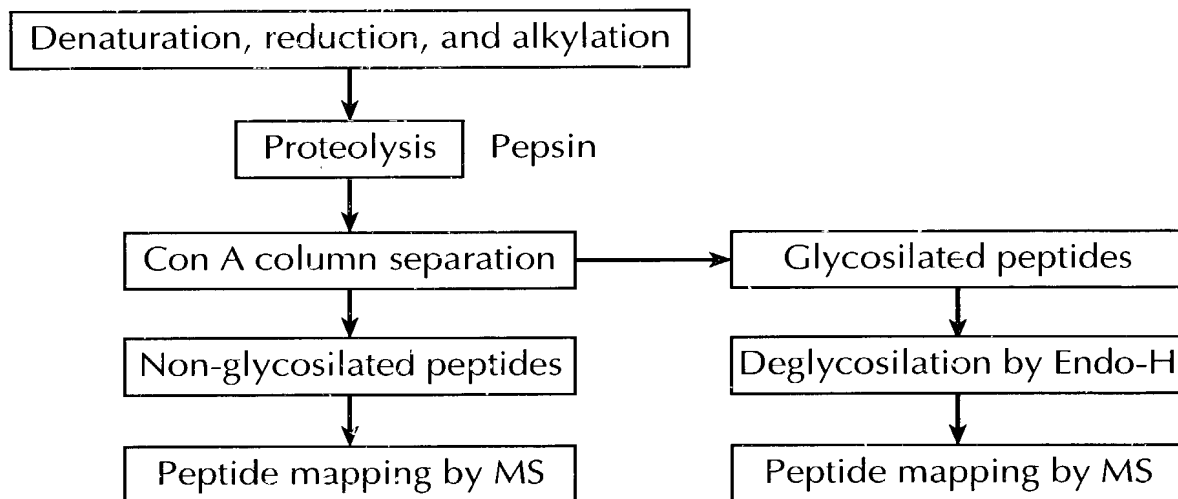


FIG. 13A

QSEPELKLES VVIVSRHGVR APTKATQLMQ DVTPDAWPTW PVKLGELTPR GGELIAYLGH
YWRQRLVADG LLPKCGCPQS GQVAILIADVD ERTRKTGEAF AAGLAPDCAI TVHTQADTSS
PDPLFNPLKT GVCQLDNANV TDAILERAGG SIADFTGHIYQ TAFRELERVL NFPQSNLCLK
REKQDESCSL TQALPSELKV SADCVSILTGA VSLASMLTEI FLLQQAQGM EPGWGRITDS
HQWNTLLSLH NAQFDLLQRT PEVARSRATP LLDLIKALT PHPPQKQAYG VTLPTSVLFI
AGHDTNLANL GGALELNWTL PGQPDNTPPG GELVFERWRR LSDNSQWIOV SLVFQTLQQM
RDKTPLSLNT PPGEVKLTLA GCEERNAQGM CSLAGFTQIV NEARIPACSL

FIG. 13B

QSEPELKLES VVIVSRHGVR APTKATQLMQ DVTPDAWPTW PVKLGELTPR GGELIAYLGH
YWRQRLVADG LLPKCGCPQS GQVAILIADVD ERTRKTGEAF AAGLAPDCAI TVHTQADTSS
PDPLFNPLKT GVCQLDNANV TDAILERAGG SIADFTGHIYQ TAFRELERVL NFPQSNLCLK
REKQDESCSL TQALPSELKV SADCVSILTGA VSLASMLTEI FLLQQAQGM EPGWGRITDS
HQWNTLLSLH NAQFDLLQRT PEVARSRATP LLDLIKALT PHPPQKQAYG VTLPTSVLFI
AGHDTNLANL GGALELNWTL PGQPDNTPPG GELVFERWRR LSDNSQWIOV SLVFQTLQQM
RDKTPLSLNT PPGEVKLTLA GCEERNAQGM CSLAGFTQIV NEARIPACSL

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FIG. 14

Phytase in Pichia

- There are three forms of phytase in Pichia. Each of them contains a single glyco-chain linked on amino acid #317, or #344, or #369.

Phytase in S. Cerevisiae

- There are three forms of phytase in S. Cerevisiae. The first form has two glyco-chain linked on amino acid #317 and #344. The second and third form carries a single glyco-chain that is linked on amino acid #317 or #344.